



## Prevalence of Anaemia and its association with socio-demographic factors among the Pnar women of Jowai Town, West Jaintia Hills District, Meghalaya, India

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### KEYWORDS

Anaemia, socio-demographic factors, Pnar women

### ABSTRACT

*Anaemia is the most common and widespread nutritional deficiency disorder in the world, especially among women in developing countries. In the present study an attempt has been made to assess the prevalence of anaemia among the Pnar women of Jowai town and the socio-demographic factors associated with it. The data were collected from 719 married women of the reproductive age group (15-49 years) from Jowai town by following internationally accepted standards. Anaemia was present in 46.59% women, of which 36.86%, 8.90% and 0.83% were mild, moderate and severe, respectively. The findings of the present study further reveal that the prevalence of anaemia was higher among younger women, women with a higher number of live births, pregnant women, a lower number of ANC visits, a low educational level and those belonging to a low income group. Logistic regression analyses shows that socio-demographic factors like number of live births, pregnancy status, number of ANC visits, self-reported morbidity, education of both mother and father, and household income, are significantly ( $p < 0.05$ ) associated with the prevalence of anaemia in the present population.*

### Introduction

Anaemia, one of the most common and widespread nutritional deficiency disorders in the world has major consequences on human health, economic and social development (WHO, 2011; Chaparro & Suchdev, 2019). The World Health Organization (WHO, 2014) defines anaemia as “a condition in which the number and size of red blood cells, or the haemoglobin concentration, fall below an established cut-off value, consequently impairing the capacity of the blood to transport oxygen around the body”. Women in the reproductive age group, especially pregnant women, are more vulnerable to anaemia because they have a dual iron requirement for their own growth and the growth of the foetus, therefore, proper intake is necessary for a healthy pregnancy (WHO, 2014; Bulliyya 2004, Lee *et al.*, 2006). The most common cause of anaemia worldwide is iron deficiency, resulting from a prolonged negative iron balance, caused by an inadequate dietary iron intake or absorption, increased needs for iron during pregnancy or growth periods, and increased iron losses as a result of menstruation and helminth (intestinal worms) infestation. Other important causes of anaemia include infections, nutritional deficiencies and genetic disorders including sickle cell and thalassemia (Stevens *et al.*, 2013; WHO, 2014). Anaemia causes adverse consequences on maternal and child health outcomes such as low birth weight, neonatal and maternal morbidity (Agarwal *et al.*, 2006; Balarajan *et al.*, 2011; Goli & Arokiasamy, 2014; Singh *et al.*, 2014). It has also been reported that iron deficiency anaemia during pregnancy results in an increased risk of premature delivery, still births, spontaneous abortions, perinatal and neonatal mortality and many other health problems (Kaiser & Allen, 2008, Nair *et al.*, 2016). Anaemia reduces the individual's well being, cause fatigue

and lethargy, and impairs physical capacity and work performance and the overall quality of life. India is among one of the countries with the highest prevalence of anaemia and accounts for 50% of global maternal deaths due to anaemia (Kumar, 2014).

Despite the rigorous efforts by the government to reduce the prevalence of anaemia in terms of free distribution of Iron Folic Acid (IFA) tablets and free advice on the nutritional requirements during pregnancy and lactation, the prevalence of anaemia in India as reported from National Family Health Survey-IV (NFHS-IV, 2015-16) is 53%, while that of Meghalaya is 52%, which is regarded the major public health problem (IIPS & ICF, 2017). Though India has been the first country to start National Nutritional Anaemia Prophylaxis Programme (NNAPP) since 1970 to control anaemia among pregnant women, a high prevalence of anaemia among pregnant women still persists, despite the availability of this effective, low cost intervention for prevention and treatment (Agarwal et al., 1988). The prevalence of anaemia varies considerably according to population characteristics like age and socio-economic status, and bio-demographic factors like pregnancy and lactation (Bentley and Griffiths, 2003; Sharma et al., 2008; NFHS-IV, 2017). Several studies have reported that anaemia is significantly associated with the educational level and economic status (Soh et al., 2015; Kundap et al., 2016, Gogoi et al., 2016). Women from a lower socio-economic status were usually found to have a high prevalence of anaemia, as it is known to be associated with a number of factors, such high number of live birth, short birth interval, poor diet both in quality and quantity, lack of health and nutrition awareness. The data from the National Family Health Survey-IV (NFHS-IV, 2015-16) has reported that anaemia is widely prevalent in all age groups, and particularly high among the vulnerable group of pregnant women aged 15-49 years, which was estimated to be around 50.3%. It also reported that anaemia was more common among women with no education and those who belong to a low economic status (IIPS & ICF, 2017). Therefore, the determination of factors that influence the occurrence of anaemia in a population is fundamental for the implementation of control measures. In view of this, the present study was undertaken to assess the prevalence of anaemia among the married Pnar women of reproductive age from Jowai town, and also to find out the various socio-demographic factors associated with it.

## **Materials and methods**

The present study was conducted among the Pnar women of Jowai town, West Jaintia Hills District, Meghalaya, India. The Pnar are one of the three indigenous tribal groups of Meghalaya, which follow a strong matrilineal kinship system and are also known to have one of the strongest matrilineal systems in the world. They occupy the Jaintia Hills which lie on the eastern part of the state of Meghalaya. Descent is through the female line; succession is also through the female line. Individuals trace their kinship identity to a particular lineage and clan. The Pnar are generally endogamous within the tribe but exogamous as far as the clans are concerned. The visiting husband system is practiced by the non-Christian Pnar. However, it is gradually changing over time. The maternal uncle plays an important role in both the social and religious matters. Jowai is the Headquarter of West Jaintia Hills District and is situated at a distance of 64 KM (approx) from Shillong, which is the capital of Meghalaya. The data for the present study was collected from 719 married Pnar women belonging to the reproductive age groups (15-49 years) using a structured interview schedule. Information on socio-demographic factors such as age, age at marriage, number of live births, pregnancy status, education and household income were collected by filling up the schedule. Estimation on haemoglobin (Hb) content was done from 719 women by finger pricking methods using sterilized lancets and analyzed immediately using a portable haemoglobin testing system. The subjects were classified as mildly, moderately or severely anaemic based upon their haemoglobin level, following the international reference recommended by the WHO (2011). Anaemia was defined as haemoglobin content of <12g/dl among the non-pregnant

women and <11 g/dl among pregnant/ lactating women. Mild anaemia was defined as haemoglobin content of 10 –11.9 g/dl in non-pregnant women and 10-10.9 g/dl in pregnant women; moderate anaemia was defined as haemoglobin content of 7-9.9 g/dl and severe anaemia as haemoglobin content of <7 g/dl in both pregnant and non-pregnant women. The quantitative data were entered, sorted and analysis by using Excel and SPSS (statistical package for social sciences). First descriptive analyzes were carried out for each of the variables. In order to examine the factors associated with the prevalence of anaemia, a binary regression analysis has been carried out with anaemia as the dependent variables and set of independent variables have been employed.

## Results

The Socio-demographic characteristics of the Pnar women of Jowai town are shown in the Table 1. The majority (40.33%) of these women belong to the age group of 24-33 years, followed by 34-43 years (37.41%) and the least is ≤ 24 years (6.82%). 42.48% of the women have 2-3 live births, 30.80% have only one live birth and 26.72% have more than 3 live births. Out of 719 married women in the age group 15 to 49 years, around 5.01% were found pregnant and the rest (94.99%) were non-pregnant. Among them, 20.86% women reported to have health problems while 79.14% did not have health problems. Most women (37.97%) and their spouses (37.22%) studied up to the secondary level. Table 1 also shows that 49.24% of the women belong to the low income groups, followed by the middle income group (26.56%) and the high income level (24.20%).

Table 1: Socio-demographic characteristics

Particulars	Number of women	Percentage
<b>Age groups (Years)</b>		
≤ 23	49	6.82
24-33	290	40.33
34-43	269	37.41
≥44	111	15.44
<b>No. of Live births</b>		
1	219	30.80
2-3	302	42.48
>3	190	26.72
<b>Pregnancy status</b>		
Pregnant	36	5.01
Non-pregnant	683	94.99
<b>Self reported morbidity</b>		
Reported	150	20.86
Non-reported	569	79.14
<b>Maternal Education</b>		
Primary	67	9.32
Secondary	273	37.97
Higher Secondary	143	19.89
Graduate & above	236	32.82
<b>Paternal Education</b>		
Primary	77	13.39
Secondary	214	37.22
Higher Secondary	105	18.26
Graduate & above	179	31.13
<b>Income groups</b>		
LIG	354	49.24
MIG	191	26.56
HIG	174	24.20

Table 2 shows the prevalence of anaemia among the married women of Jowai town. It is found that out of 683 non-pregnant women, 54.47% are non-anaemic and 45.53% are anaemic; of which 36.75% are mild anaemic, 8.05% are moderate anaemic and 0.73% are severe anaemic. It is also found that out of 36 pregnant women, 33.33% are non-anaemic and 66.67% are anaemic; of which 38.89% are mild anaemic, 25.00% are moderate anaemic and 2.78% are severe anaemic. The table further reveals that the overall prevalence of anaemia among the study population is 46.59%, out of which 36.86% are mild anaemic, 8.90% are moderate anaemic and 0.83% are severe anaemic. Fig 1 depicts the prevalence of anaemia among the married women of Jowai town and Fig 2 the severity of anaemia among the Pnar women.

Table 2: Prevalence of anaemia

Variables	Non-pregnant women (N=683)		Pregnant women (N=36)		Total (N=719)	
	N	%	N	%	N	%
Non-Anaemic ( $\geq 12$ g/dl)	372	54.47	12	33.33	384	53.41
Mild Anaemia (10.0-11.9 g/dl)	251	36.75	14	38.89	265	36.86
Moderate Anaemia (7.0-9.9 g/dl)	55	8.05	9	25.00	64	8.90
Severe Anaemia ( $< 7.0$ g/dl)	5	0.73	1	2.78	6	0.83

\*For pregnant women: mild anaemia 10.0-10.9 g/dl and non-anaemic  $\geq 11$  g/dl

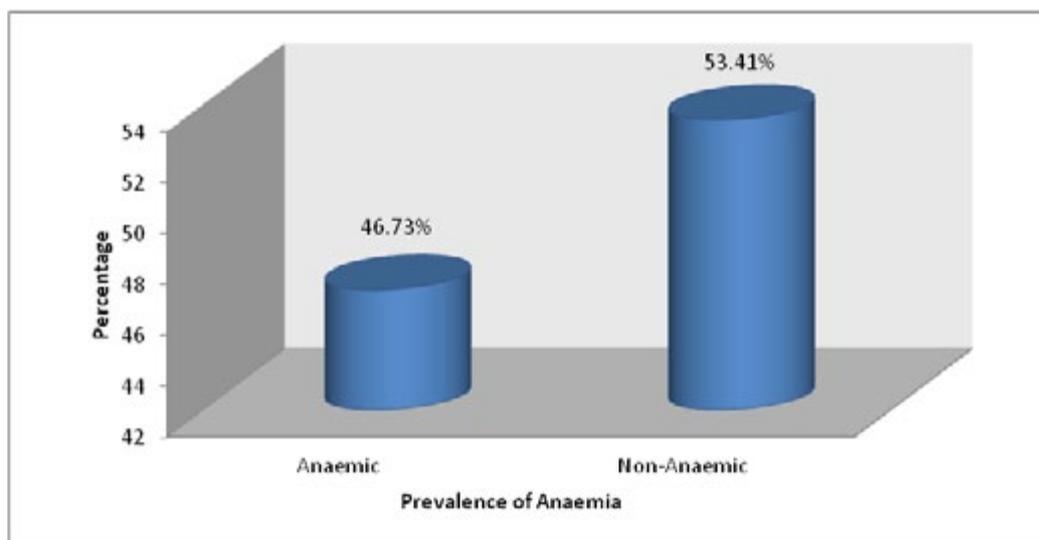


Fig 1: Prevalence of anaemia among Pnar women

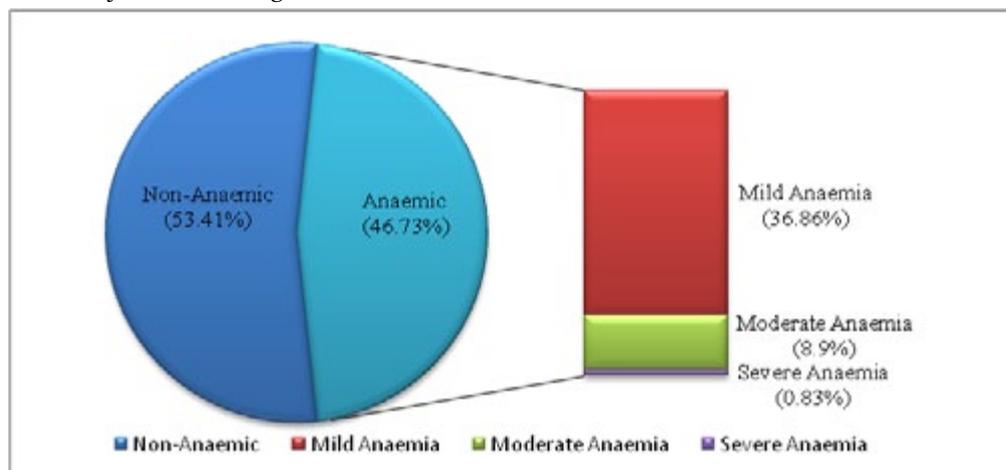


Fig 2: Severity of anaemia among Pnar women

The Logistic regression analysis and Odd ratio (OR) of the socio-demographic factors associated with the prevalence of anaemia are given in Table 3. The odds ratio reveals that socio-demographic factors like number of live births, pregnancy status, number of ANC visits, self-reported morbidity, education of both mother and father, and household income are statistically significant ( $p < 0.05$ ) factors associated with the prevalence of anaemia among the married women of Jowai town. Findings from the analysis show that the women belonging to the age group  $\leq 23$  years are more prone to anaemia. Women with more than three children are more likely to be anaemic than women with one child or two to three children with the odds ratio at 2.04 (C.I. 1.37-3.02). The findings of the present study show that pregnant women are more likely to be anaemic as compared to non-pregnant women with an odd ratio at 2.39 (C.I. 1.18-4.86). Women with more than four ANC visits are less likely to be anaemic compared to those with less than or four ANC visits with odds ratio at 0.62 (0.45-0.86). Women with a reported morbidity are more likely to be anaemic as compared to women with non-reported morbidity with an odd ratio at 2.74 (C.I. 1.88-3.99). Table 3 also shows that women who are graduate and above are less likely to be anaemic compared to the rest of the educational levels with odds ratios at 0.17 (C.I. 0.10-0.31). Women whose husbands have completed higher secondary, graduate and above are also less likely to be anaemic compared to the other educational levels. Women belonging to the high income group are less likely to become anaemic than the middle and low income group with odds ratios of 0.16 (C.I. 0.11-0.25).

Table 3: Logistic regression analysis of socio-demographic factors associated with the prevalence of anaemia

Variables	Anaemic N	Non-anaemic N	Odds ratio (C.I. 95%)	P value
<b>Age (Years)</b>				
$\leq 23$	26 (53.06)	23	Reference	0.786
24-33	134 (46.21)	156	0.76 (0.41-1.39)	
34-43	124 (46.10)	145	0.73 (0.40-1.35)	
$\geq 44$	52 (46.85)	59	0.81 (0.41-1.59)	
<b>Number of live births</b>				
1	86	133	Reference	0.001
2-3	136	166	1.23 (0.87-1.76)	
>3	106	84	2.04 (1.37-3.02)	
<b>Pregnancy status</b>				
Non-pregnant	311	372	Reference	0.016
Pregnant	24	12	2.39 (1.18-4.86)	
<b>Number of ANC visits</b>				
$\leq 4$	109	87	Reference	0.005
> 4	224	297	0.62 (0.45-0.86)	
<b>Self-reported morbidity</b>				
Non-reported	235	334	Reference	0.000
Reported	100	50	2.74 (1.88-3.99)	
<b>Education of the mother</b>				
Primary	48	18	Reference	0.000
Secondary	161	112	0.63 (0.35-1.12)	
Higher Secondary	57	86	0.28 (0.15-0.53)	
Graduate & above	69	167	0.17 (0.10-0.31)	
<b>Education of the father</b>				
Primary	43	34	Reference	0.000
Secondary	124	90	1.01 (0.60-1.72)	
Higher Secondary	35	70	0.38 (0.20-0.69)	
Graduate & above	60	119	0.37 (0.21-0.64)	

Income groups			Reference	
LIG	208	146		0.000
MIG	93	98	0.68 (0.48-0.97)	
HIG	34	140	0.16 (0.11-0.25)	

## Discussion

The findings of the present study reveals that the overall prevalence of anaemia among the married women in Jowai town is 46.59%, which is lesser than that of Meghalaya as well as India in general, as reported by the National Family Health Survey-IV (NFHS-IV, 2015-2016), which were estimated at 56.2% and 53%, respectively (IIPS & ICF, 2017). The prevalence rate of mild, moderate and severe anaemia in the present study is 36.86%, 8.90% and 0.83% respectively, which is much lower than the state statistics as reported by the NFHS-IV (2015-2016), which were estimated at 38.7%, 16.1% and 1.4%, respectively. Prevalence rate of anaemia is much higher among the younger women. Women who have more live births are at higher risk of anaemia. Similar findings were reported by Dey et al., (2010) among women in Meghalaya, where the prevalence of anaemia was found the highest among the age groups of 20-24 years and those with an increasing number of children ever born. It is also observed that women with reported health problems are more likely to be anaemic than those with non-reported health problems. Women with more than four ANC visits are less anaemic than those with less than or equal to four ANC visits. A similar finding was reported by Namoijam et al., (2020) among women of Manipur, which indicates that women with more than five ANC visits are less anaemic. Findings of the present study show that pregnant women are more likely to be anaemic than non-pregnant women, which is in conformity with the earlier studies reported by the NFHS-IV (2015-16), Dey et al., 2010 and Haloi & Limbu, 2013. Among Pnar women the proportion of anaemia was higher among the low educational level and the low economic status. The present findings are in conformity with the findings of the NFHS-IV (2015-16), which reported that anaemia was more common among the women with no education and those who belong to the lower socio-economic status. The prevalence rate of anaemia declines steadily with an increased educational level and household income (IIPS & ICF, 2017). The logistic regression reveals that socio-demographic factors like number of live births, pregnancy status, number of ANC visits, self reported morbidity, educational status of mother and father and household income are significantly associated with the prevalence of anaemia. The present finding substantiates the results of other studies which document that the educational level and socio-economic status of the family are significantly associated with the mother's anaemic status (Kansal et al., 2018; Gogoi et al., 2016; Dey et al., 2010; Haloi & Limbu, 2013, Namoijam et al., 2020). It may be concluded that women from a better socio-economic background have a better health status.

## Conclusion

In the present study the prevalence rate of anaemia among women in the reproductive age group (15-49 years) is 46.59%, and the majority has mild anaemia (36.86%). The highest rate of anaemia is found among the women of the age groups of  $\leq 23$  years and those with more than three live births. In the present study, it was also observed that the prevalence of anaemia was higher among women with a lower level of education and those belonging to a low economic status. From the findings of the present study it may be concluded that women belonging to a high socio-economic status are less anaemic. Overall, based on the findings of the present study, we emphasize on the importance of the varying effects of the socio-demographic factors in predicting anaemia levels of the women of Jowai town. Particularly, in a country where the fertility rate is still reasonably high, socio-demographic factors play a major role in influencing the prevalence of anaemia as well, which can be addressed

during antenatal and postnatal care in general through iron and folic acid consumption and dietary intake in particular. This study would like to bring to the attention of policy makers and regional administrators that they should make efforts to prevent and control anaemia through an effective campaign to motivate women and provide information about the importance of a mother's good health and the impact it has on the family and society.

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